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CERTIFICATE

This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 16 August 2002 with an application for Letters Patent number 520817 made by Charles Caulder BREE.

I further certify that pursuant to a claim under Section 24(1) of the Patents Act 1953, a direction was given that the application proceed in the name of Ezi Tilt Developments Limited.

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Dated 9 September 2003.

Neville Harris

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Commissioner of Patents, Trade Marks and Designs

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520817

SUBSTITUTION OF APPLICANT
UNDER SECTION 24

PATENTS FORM NO. 4
Appln Fee: $50.00
James & Wells ref: 27766/37 CJ

PATENTS ACT 1953
PROVISIONAL SPECIFICATION

IMPROVED TILT MECHANISM

I CHARLES CAULDER BREE, a New Zealand citizen of 1 Koheroa Road, RD 2, Mercer, New Zealand,

do hereby declare this invention to be described in the following statement

IMPROVED TILT MECHANISM

TECHNICAL FIELD

The present invention relates to improvements in or relating to tilt mechanisms and uses thereof. The present invention may be particularly suitable as an outboard motor tilt mechanism and/or component of same. However, because the invention may have many uses and/or applications it is to be understood and appreciated that the invention is not to be limited to such use. The prior art and possible applications of the invention as discussed below are therefore given by way of example only.

BACKGROUND ART

At present there are a number of outboard motor/engine tilt systems available, which include electrical and hydraulic trimming systems (mainly for use with motors of a size over 30 horsepower (HP) due to weight considerations). Such systems often require installation by skilled technicians, and can be relatively difficult and/or expensive to install and maintain.

By 'tilt' it is referred to be the provision for movement of an object or boat outboard motor from a first angled position to a second angled position (and/or any other position) and this movement may also be reversible. First and second positions are not fixed locations, but merely used to illustrate a change in location and/or angle.

Such systems for lighter-weight motors (generally those under 30 HP) are often not installed given the relative costs and general usage of those vessels utilising such smaller motors. Such motors without auto-trim systems and/or tilt mechanisms require quite a physical effort to tilt and operating various locking levers. This means the operator needs to stand adjacent to the engine and physically tilt. The hinged bracket pivot points on these engines are such that the engine is not balanced for easy lift which

can be an added problem when coming into shallow water, with the motor operator having to manoeuvre the boat and also co-ordinate tilting/raising the engine at the roughly the same time.

Generally, motors under 30 HP do not have trim or tilt mechanisms supplied that substantially reduce physical effort, and if they do, such mechanisms may require battery assistance to operate and/or are slow to operate (which may not be particularly useful during an emergency).

It is preferable for a system and/or mechanism to be designed that allows for quick and easy tilt of motors. A mechanism that allows the motor to tilt, without substantial physical manual effort, and to additionally clear the bottom in shallow water (i.e. not contacting the seabed or lakebed by running aground) when beaching the boat, or entering shallower waterways. It may also be advantageous to provide a system that reduces the amount of physical handling of a motor into a tilted position suitable to avoid contact with a seabed or lakebed and which can be roughly deemed to be a hands-free tilt system for boat outboard motors.

All references, including any patents or patent applications cited in this specification are hereby incorporated by reference. No admission is made that any reference constitutes prior art. The discussion of the references states what their authors assert, and the applicants reserve the right to challenge the accuracy and pertinency of the cited documents. It will be clearly understood that, although a number of prior art publications are referred to herein, this reference does not constitute an admission that any of these documents form part of the common general knowledge in the art, in New Zealand or in any other country.

It is acknowledged that the term 'comprise' may, under varying jurisdictions, be attributed with either an exclusive or an inclusive meaning. For the purpose of this specification, and unless otherwise noted, the term 'comprise' shall have an inclusive

meaning - i.e. that it will be taken to mean an inclusion of not only the listed components it directly references, but also other non-specified components or elements. This rationale will also be used when the term 'comprised' or 'comprising' is used in relation to one or more steps in a method or process.

It is an object of the present invention to address the foregoing problems or at least to provide the public with a useful choice.

Further aspects and advantages of the present invention will become apparent from the ensuing description which is given by way of example only.

DISCLOSURE OF INVENTION

According to one aspect of the present invention there is provided a tilt mechanism which includes:

(a) a mounting bracket attached to a backing plate by

(b) a first pivoting point, and

(c) a second pivoting point.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above wherein an object to be tilted and/or housed by the tilt mechanism may be attached to the mounting bracket.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said mounting bracket may be of any shape or configuration as required or desired to allow attachment to it by an object.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said object may be a boat outboard motor.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said backing plate is substantially rigid and attached to a boat.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said backing plate connects said first and second pivot points with said mounting bracket.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said mounting bracket may utilise a spring system to provide upward tilt assistance of an object.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said spring system may be tension adjustable.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said first and second pivot points are substantially located and connected to the said mounting bracket to allow said object to balance at a non-vertical axis.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said first and second pivot points may be an arm attached to said backing plate and mounting brackets.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said first and second pivots may be a slotted roller-type system.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein a combination of arms and/or slotted roller-type systems may be utilised.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said mounting bracket may have a set of tilt mechanisms attached to each end.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein a locking system may be employed to resist tilting of said ingr aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said locking system may be used to substantially prevent upward and/or downward tilt.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein a thrust stop may be employed to provide a maximum point of downward tilt.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said locking system may be activated remotely.

According to another aspect of the present invention there is provided a tilt mechanism substantially as described above, wherein said locking system may be activated by cable, solenoid, ratchet, latch or any other system for locking the mounting bracket in a fixed position.

In a preferred embodiment of the present invention the tilt mechanism may include

(a) a mounting bracket connectably attached to a backing plate by

(b) a first pivoting point, and

(c) a second pivoting point.

The design of this mounting tilt system works utilising the weight of the object fitted to assist the tilting movement of the mounting bracket and in turn bringing the object to a tilted position.

Mechanisms can be manufactured in rigid material such as aluminium or stainless steel, ideally suited for strength and marine corrosion resistant.

Preferably an object to be tilted may be attached to the mounting bracket. Any objects requiring tilting may be attached to the mounting bracket, however it may be particularly preferable for a boat outboard motor to be attached.

The mounting bracket may be any shape or configuration as required or desired to allow attachment to it by an object. It may be that custom design of a mounting bracket is required to suitably fit a particular object attachment.

Preferably the backing plate of the tilt mechanism is substantially rigid and may be attached to a boat. Any such suitable attachment means for connecting the tilt mechanism (ie via the backing plate or otherwise) may be used, for example nails, screws, welding, glue, clamps, etc.

The area where the backing plate may be attached to a boat may be in the transom region. It may be that the materials used for the backing plate and/or any other components of the tilt mechanism manufactured in rigid materials such as aluminium or stainless steel, ideally suited for strength and marine corrosion resistance. Of course, materials for construction are based on their strength requirement and ability to suit the surrounding environmental conditions.

Preferably the mounting bracket may utilise a spring system to provide upward tilt assistance of the object. Of course, any such spring system or means for provision of assisted tilting is suitable. The finer adjustment to the speed and power of the tilt movement is achieved by an adjustable tension spring or springs.

The extra tension adjustment assists to hold the object over its pivoted balance point and in the raised position without the need for locking or stabilisation.

Springs may be used to add to the power of the mechanism, preferably an adjustable tension spring system can be used and adjusted to help balance the object tilt when different weights of objects are attached to the mounting bracket.

When an object sits on the mounting bracket the arrangement of pivot points cause the mounting bracket to rotate, which in turn tilts the object fixed to the mounting bracket, upward without requiring assistance by operator.

The tilt mechanism may be operated from a remote position (eg forward steering position in a boat) by releasing the locking system which may be activated, for example by a cable or solenoid (if battery available) or other suitable means. In the case of a boat, the locking system may be fully operable from any position in the boat, where a release/lock cable locking system or other can be fitted.

Further, to return the motor to a downward drive position, the repositioning of the motor may be performed manually with very little effort or it can be brought back to the downward drive position by putting the motor into forward gear. By putting the motor into forward gear, the propeller creates thrust in the water, which overcomes the pivoted (spring assisted) balanced tilt position, and the motor forces itself downwards. This is useful as the motor can drive itself back to operating position, motor can then be locked into a fixed position by utilising the locking system.

The system may be operated using the weight of an motor to assist the tilt upward movement, using forward drive (thrust created by propeller) to relocate and it may or may not be locked an operating down position. Pulling a relocating pin to release and the mechanism automatically tilts upward when the motor is out of forward drive.

Similarly, when forward thrust created by a propeller is reduced, the motor weight (spring assisted if required) will tilt upwards automatically. The level of tilt is such that the propeller will still remain submerged enough to allow minimal reverse drive. However, when utilizing the motor in stronger reverse drive, the propeller will create thrust that will tend to want to push the propeller upwards out of the water. This problem may be overcome by either, locking the tilt mechanism into a fixed position, or providing a maximum upward tilt position (enough to allow upward tilt to avoid propeller grounding, but also to ensure the propeller remains submerged in water to provide reverse drive thrust).

BRIEF DESCRIPTION OF DRAWINGS

Further aspects of the present invention will become apparent from the following description which is given by way of example only and with reference to the accompanying drawings in which:

Figure 1 Mechanism end elevation view of one possible embodiment of the present invention;

Figure 2 Movement of engine mount through arc B and arc A view of one possible embodiment of the present invention;

Figure 3 An alternative pivoting slotted roller-type system as a possible embodiment of the present invention;

Figure 4a A possible attachment location onto a boat transom as a possible embodiment of the present invention, and

Figure 4b A further possible attachment location onto a boat transom as a possible embodiment of the present invention..

BEST MODES FOR CARRYING OUT THE INVENTION

Tilting mechanism movement is created by means of a free moving engine mounting bracket 2 connected to backing plate 3 by means of pivoting link arms 4 and 5, first pivot point 6 and second pivot point 7 utilising the engine weight pulling downward on mounting bracket 2 moving pivot points 6 and 7 down and outwards in arcs A and B as indicated by arrows in Figure 2. Further, as illustrated in Figure 3, the pivot link arms may be substituted for a slotted roller-type system 12.

It is also acknowledged that a combination of either pivoting link arms or slotted roller-type systems may be utilised.

This causes the mounting bracket 2 to rotate causing the engine attached to mounting bracket 2 to tilt upward and forwards. This upward and forward tilt is illustrated by the lines of mounting bracket at different tilt positions as indicated by C and D given movement of the pivots in directions as indicated by the arrows in Figure 2.

As engine size increases (i.e. horse power) so does the weight of such larger motors, and consequently the tilt mechanism may need some extra pulling force to help tilt the motor. This can be in the form of an adjustable spring tensioner 8. The spring tension also assists the mechanism to hold the unit in a raised position. Spring tension adjustment is achievable by altering the anchor position of the spring, or using a different spring. If the tension is adjusted correctly, once the lock system 10 is released, and the engine is out of forward drive, the motor will tilt upwards to rest at a tilt angle/position adequate to prevent a motor hitting bottom if boat were aground (but still at a level to allow the propeller to remain slightly submerged to maintain enough drive to push the tilted motor down and to a full drive position). Also, when the mounting bracket pushes against thrust stop 9, and with lock system 10 engaged the engine can be placed in reverse drive without tilting upwards.

The unit presently illustrated has two sets of tilt mechanism at each end of the mounting bracket 2, each a mirror image of the other.

Each tilt mechanism 1 works co-operatively when in a dual set up and are together linked through the mounting bracket 2.

The entire tilt mechanism and individual components making up the present invention can be extended in length and/or one or more tilt mechanisms combined to provide for example, two outboard motors, and it is therefore possible to raise two outboard motors at the same time. The components required can be reduced or increased in size and strength to suit different object applications.

As illustrated in Figures 4a and 4b the tilt mechanism can be attached to the transom of a boat in either a semi-detached configuration Figure 4a, or as more of an integrated structure Figure 4b. In Figure 4a, the backing plate is attached by screws 11.

Aspects of the present invention have been described by way of example only and it should be appreciated that modifications and additions may be made thereto without departing from the scope thereof.

CHARLES CAULDER BREE
by his Attorneys
JAMES & WELLS
Per:

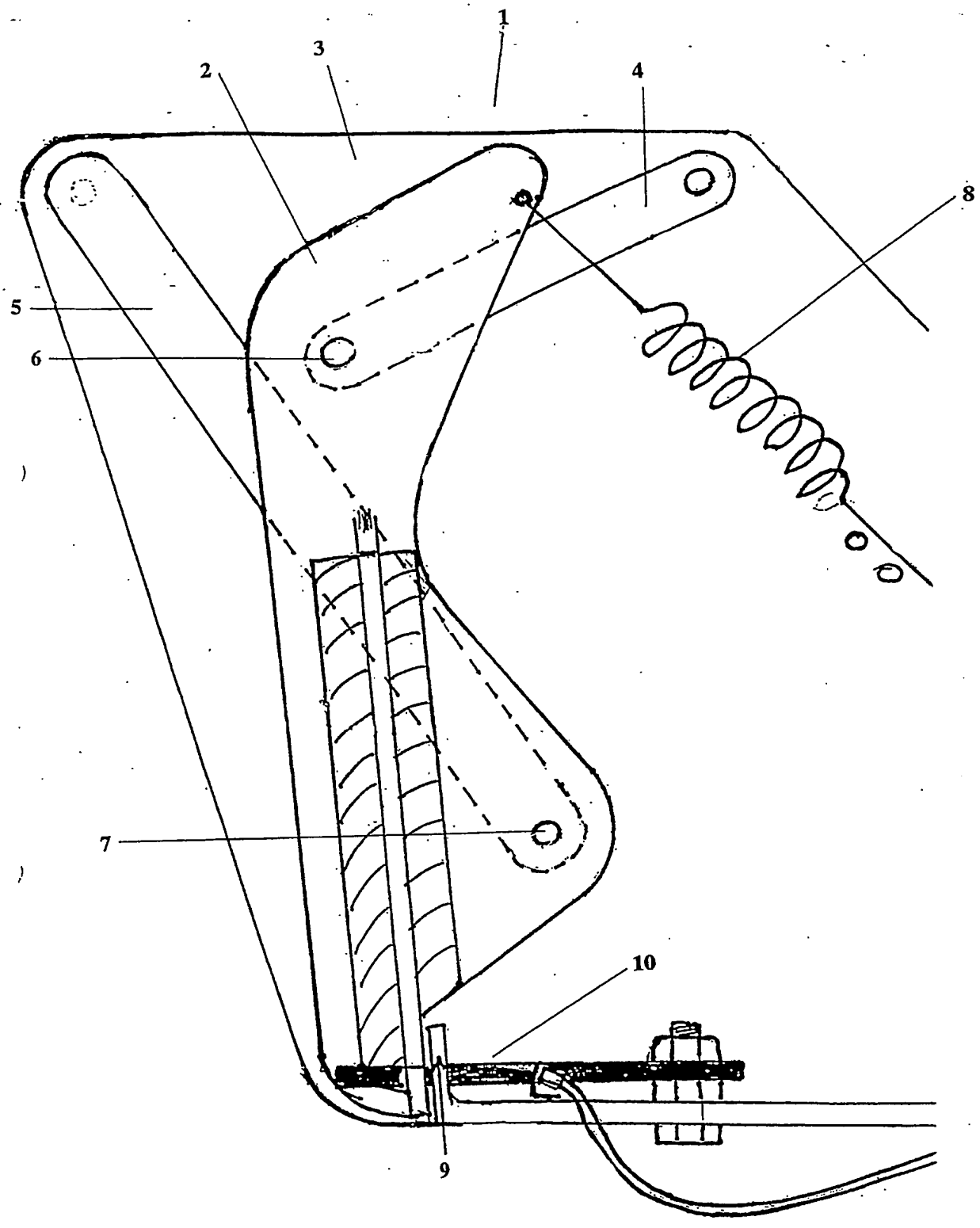

FIGURE 1

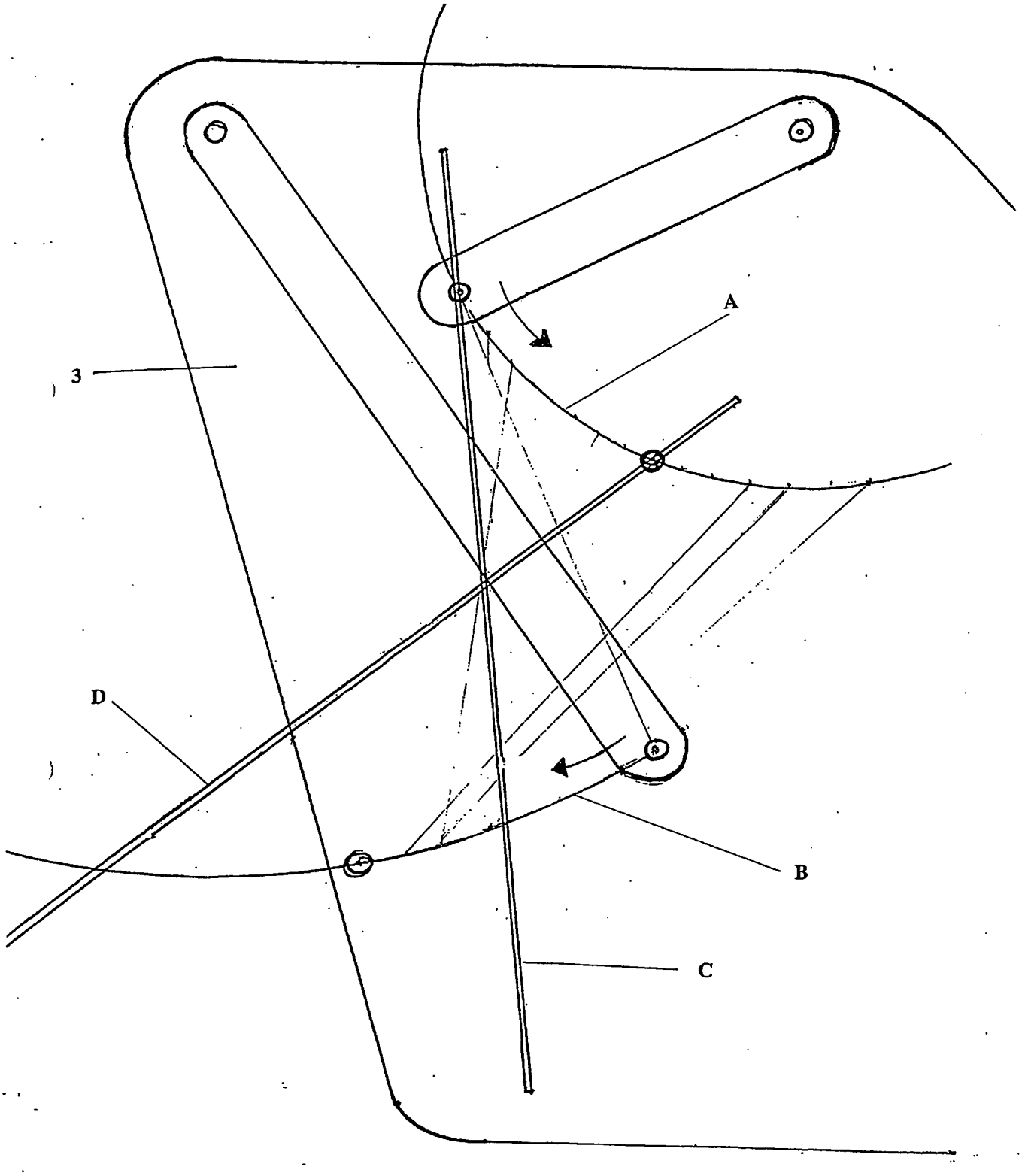

FIGURE 2

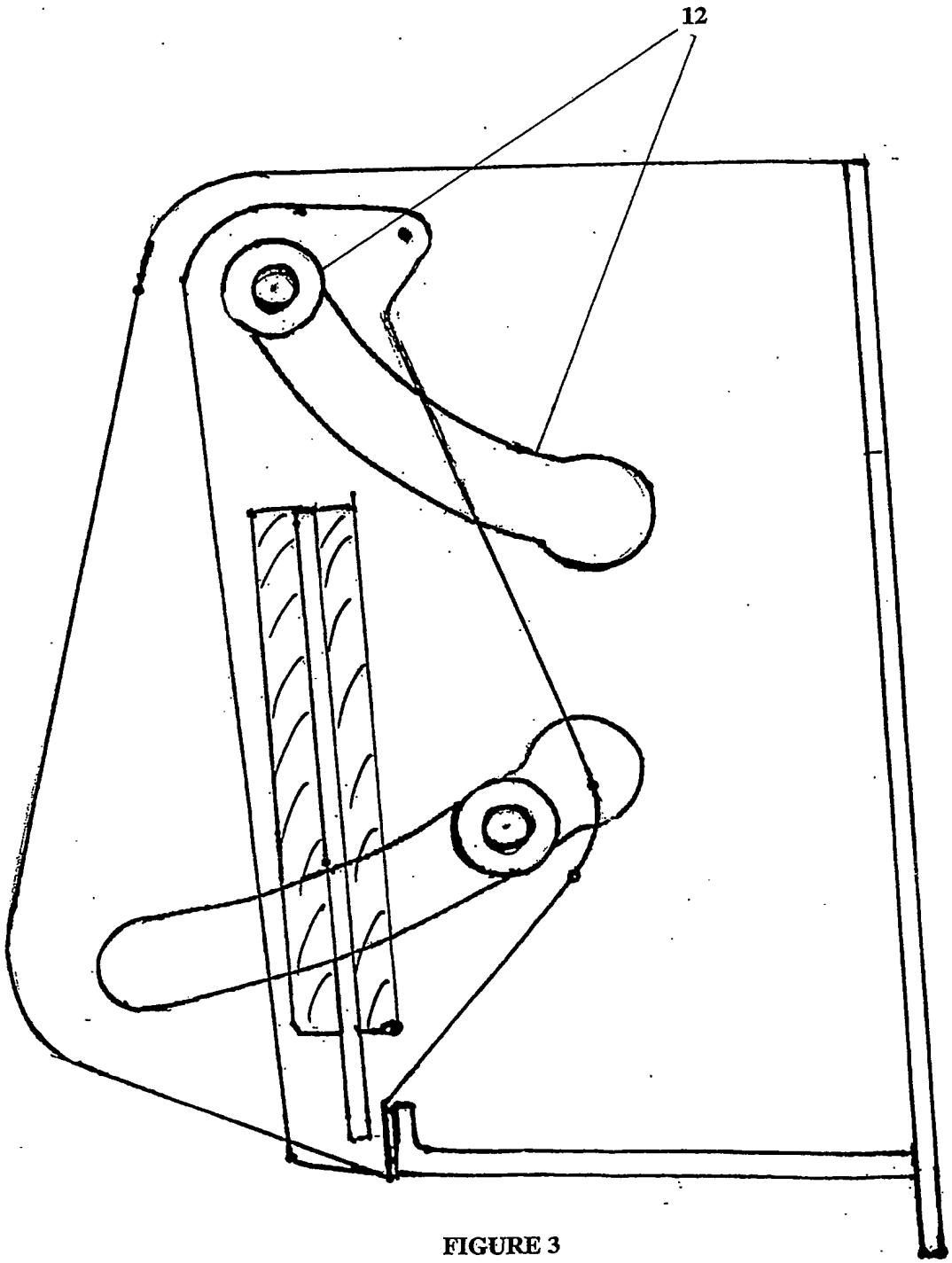

FIGURE 3

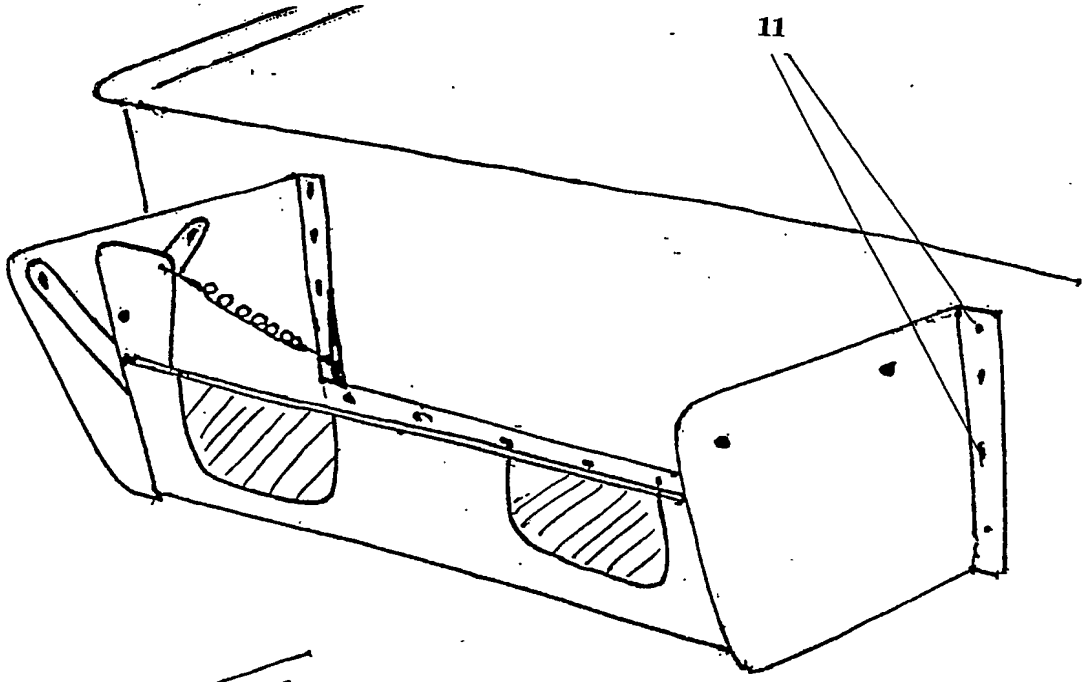

FIGURE 4a

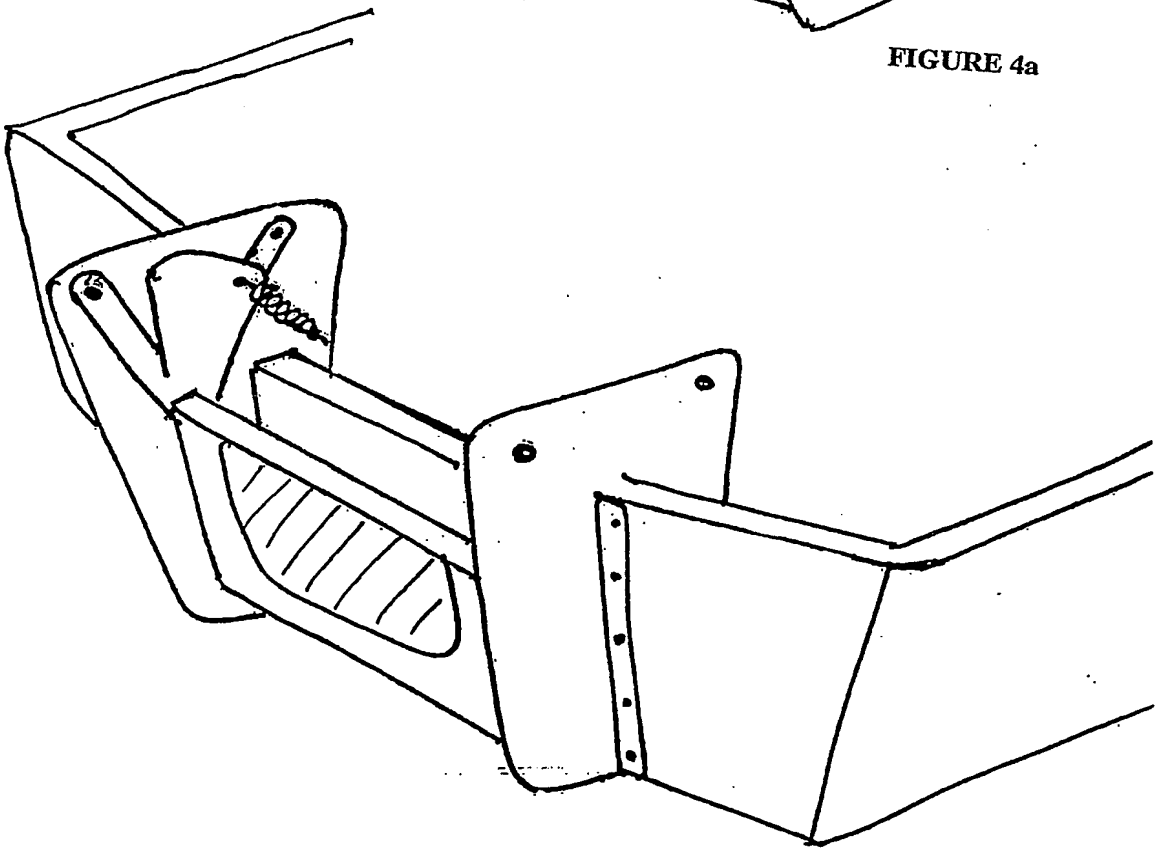

FIGURE 4b